REMARKS

Reconsideration and allowance of the above-identified application is respectfully requested. Claims 1-16 remain pending.

The specification is objected to because of a minor informality. In particular, the Office Action objects to paragraphs 19 and 20 (in the published application) because paragraph 19 defines (x_k, y_k, z_k) as the satellite position, and paragraph 20 states that (x_p, y_p, z_p) are velocity components of the satellite. The Office Action objects to these statements because it appears that from equation 1, in paragraph 19, (x_k, y_k, z_k) should have the dimensions of velocity, and not position.

Applicants contend that the equation 1 is correct and have provided support to show that equation 1 is correct. Equation 1 is disclosed in the following references which are attached beginning on page 29: Global Positioning System: Theory and Applications, Volume 1 by Bradford W. Parkinson, et al., page 138, Table 8, and Understanding GPS Principles and Applications by Elliot D. Kaplan, page 38, Table 2.3. In view of the discussion above and the attachments provided, this objection has been overcome.

The Office Action also objects to claim 1 because of an alleged informality in line 6. Specifically, the Office Action objects to "satellite" [sic], stating that this should be --satellite--. Applicants assume the Office Action is objecting to the typographical error "satillite" on line 6 of claim 1, which is corrected by way of amendment herein.

Claims 1-16 are rejected under 35 U.S.C. §112, first paragraph, as allegedly failing to comply with the enablement requirement. The Office Action alleges that the claims contain subject matter that was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make or use the invention.

More particularly, the Office Action alleges that the term "pseudo velocity" is clearly defined. The Office Action alleges that paragraph 40, lines 19-24 defines pseudo

velocity as "the relative velocity between the satellite and the mobile station (MS). However, in paragraph 92, equation 20(a) . . . it appears that the velocity of MS is not taken into account, and that the 'pseudo velocity' is the velocity of the satellite in ECEF coordinates, where certain times delays are determined based on the position of the MS." This rejection is respectfully traversed. As discussed in greater detail below, the term pseudo velocity is clearly described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make or use the invention.

Claims 1-16 are rejected under 35 U.S.C. §102(b) as being anticipated by each of U.S. Patent Nos. 6,016,117 to Nelson, Jr. (Nelson), 6,147,641 to Issler, and 6,181,275 to Chenebault et al. (Chenebault), and a first paper entitled "New Studies on Acquisition and Tracking Threshold's Reduction for GPS Spaceborne and Aeronautical Receivers" by Rene Jr. Landry et al. (Landry), and a second paper entitled "Performance of a Low Earth Orbit Navigation System: Error Model, Impact of Doppler Measurements, Comparison with GPS and Application to Civil Aviation" by Bruno Lobert et al. (Lobert). These rejections are respectfully traversed.

Specifically, the Applicants respectfully submit that each of Nelson, Issler, Chenebault, Landry and Lobert fails to teach or suggest the specific features of the present invention for an apparatus and method for calculating satellite acquisition information to determine a position of an mobile station (MS) in a network assisted GPS system.

In particular, the Applicants submit that that each of Nelson, Issler, Chenebault, Landry and Lobert fails to teach or suggest all of the features recited in independent claim 1 including the claimed features of a satellite data collector for collecting satellite orbital information and pseudo range of more than three consecutive times from a plurality of satellites, a satillite velocity calculator for calculating velocity of satellites using the satellite orbital information, a pseudo velocity calculator for calculating pseudo

velocities between the MS and each satellite observed by the MS at a position measurement time of the MS using the velocity of satellites, and a satellite acquisition information calculator for calculating a code phase using the pseudo range, and for calculating a Doppler shift using the pseudo velocity.

Furthermore, the Applicants submit that that each of Nelson, Issler, Chenebault, Landry and Lobert fails to teach or suggest all of the claimed features recited in independent claim 9 including the features of collecting satellite orbital information and pseudo range of more than three consecutive times from a plurality of satellites, calculating velocity of satellites using the satellite orbital information, calculating pseudo velocities between the MS and the each satellite observed by the MS at a position measurement time of the MS using the velocity of satellites, calculating a code phase using the pseudo range, and calculating a Doppler shift using the pseudo velocity.

Rather, Nelson merely discloses a method for the efficient determination of a GPS satellite orbital position. Issler merely discloses a process for the autonomous reduction of acquisition and tracking thresholds of carriers received in orbit. Chenebault merely discloses a method for locating a receiver in a navigation system by computing pseudo speeds in a satellite navigation system. Landry merely discloses a method to reduce the threshold for acquisition and tracking for GPS spaceborne and aeronautical receivers. And Lobert merely discloses the creation of an error model to characterize the statistics of each error term in function of the satellite-receiver geometry to enhance operation of a satellite based navigation system.

These rejections will now be discussed in more detail.

The present invention relates to an apparatus and method for recognising position information of a mobile station (MS) (i.e., a mobile terminal) in a mobile communication system. More particularly, the present invention relates to an apparatus and method for

calculating satellite acquisition information to detect position information of the MS in a Network Assisted GPS (Global Positioning System).

The embodiments of the present invention accomplish these objects by providing an apparatus for calculating satellite acquisition information for controlling a position determination entity (PDE) to determine a position of a mobile station (MS) in a network assisted GPS system composed of the MS containing a GPS receiver and the PDE containing a reference station GPS receiver. The apparatus comprises a satellite data collector for collecting satellite orbital information transferred from a plurality of satellites to the reference station GPS receiver, and storing satellite orbital information of more than three consecutive times T0~T2 of the satellites, a pseudo range calculator for receiving the satellites' position coordinates calculated based on the satellite orbital information of more than three consecutive times T0~T2 and position coordinates of a base station (BS) communicating with the MS, and calculating a pseudo range between the MS and a satellite observed by the MS using the received information, and a pseudo velocity calculator for receiving satellites' velocity information calculated based on the satellite orbital information of more than three consecutive times T0~T2, and calculating pseudo velocities between the satellite observed by the MS and the MS at a position measurement time of the MS using the received information. The apparatus for calculating satellite acquisition information further comprises a satellite acquisition information calculator for calculating a code phase using the pseudo range, calculating a Doppler shift using the pseudo velocity, and for calculating the satellite acquisition information containing the code phase and the Doppler shift.

The embodiments of the present invention accomplish these objects by providing a method for calculating satellite acquisition information for controlling a position determination entity (PDE) to determine a position of an mobile station (MS) in a Network Assisted GPS system composed of the MS containing a GPS receiver and the PDE containing a reference station GPS receiver. The method comprises the steps of

collecting satellite orbital information transferred from a plurality of satellites to the reference station GPS receiver, and storing satellite orbital information of more than three consecutive times T0, T1, and T2 of the satellites, receiving the satellites' position coordinates calculated based on the satellite orbital information of more than three consecutive times T0, T1, and T2 and position coordinates of a base station (BS) communicating with the MS, calculating a pseudo range between the MS and a satellite observed by the MS using the received information, and receiving satellites' velocity information calculated based on the satellite orbital information of more than three consecutive times T0, T1, and T2, and calculating pseudo velocities between the satellite observed by the MS and the MS at a position measurement time of the MS using the received information. The method for calculating satellite acquisition information further comprises calculating a code phase using the pseudo range, calculating a Doppler shift using the pseudo velocity, and acquiring the satellite acquisition information containing the code phase and the Doppler shift.

DISCUSSION OF THE REJECTIONS UNDER 35 U.S.C. §112, FIRST PARAGAPH

Claims 1-16 are rejected under 35 U.S.C. §112, first paragraph, as allegedly failing to comply with the enablement requirement. The Office Action alleges that the claims contain subject matter that was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make or use the invention. More particularly, the Office Action alleges that the term "pseudo velocity" is not clearly defined. The Office Action alleges that paragraph 40, lines 19-24 defines pseudo velocity as "the relative velocity between the satellite and the mobile station (MS). However, in paragraph 92, equation 20(a) . . . it appears that the velocity of MS is not taken into account, and that the 'pseudo velocity' is

the velocity of the satellite in ECEF coordinates, where certain times delays are determined based on the position of the MS."

The pseudo velocity calculated by equations 19 and 20 does, in effect, take into account the velocity of the MS. The pseudo velocity calculated by equation 20 is based on a real range between the satellite and the GPS receiver. The GPS receiver is co-located with the BS. The BS, according to paragraph [0073], is presumed, for purposes of discussion in the specification, to be co-located with the MS. Thus, any pseudo velocity calculated between the satellite and the GPS receiver does determine the pseudo velocity between the satellite and the MS. Since paragraph [0040] states that the pseudo velocity calculator calculates "pseudo velocities between the satellite observed by the MS and the MS at a position measurement time of the MS using the received information", and the GPS is co-located with the BS, and the BS is co-located with the MS, the position of the GPS, BS and MS are substantially identical. Therefore, equation 20 does indeed take into account the velocity of the MS.

Therefore, having shown that the velocity of MS is taken into account in calculating the pseudo velocity by equations 19 and 20, it is therefore respectfully requested that the rejection under 35 U.S.C. §112, first paragraph be withdrawn.

DISCUSSION OF THE REJECTIONS UNDER 35 U.S.C. §102(b)

Turning now to the §102(b) rejections, the Office Action rejects claims 1-16 under 35 U.S.C. §102(b) as being anticipated by Nelson. Nelson discloses a method for calculating a GPS satellites' positions by numerical integration. The GPS receiver of Nelson integrates over eccentric anomaly E as an independent variable rather than time, in order to use an integration method that is exact for sinusoidal motion, since the components of motion and time are sinusoidally related to the eccentric anomaly E. Using eccentric anomaly as an independent variable, the GPS receiver performs Leapfrog

integration on a first sample and a second sample to determine a subsequent sample. The subsequent sample is uniformly spaced with respect to eccentric anomaly in comparison to the first sample and the second sample. The Leapfrog integration of the present invention is computationally efficient and exact over longer step sizes.

Regarding the 35 U.S.C. §102(b) rejections, it is well known that "[a] claim is anticipated only if *each and every element* as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987) (emphasis added).

Respectfully, the Applicant submits that Nelson does not teach or suggest each and every claimed feature of independent claim 1. Independent claim 1 includes the claimed features of "a satellite data collector, a satellite velocity calculator, a pseudo velocity calculator for calculating the pseudo velocity between the MS and each satellite observed by the MS at a position measurement time of the MS using the velocity of satellites, and a satellite information acquisition information calculator." Respectfully, the Applicant submits that Nelson does not teach or suggest the claimed features of a satellite data collector, a satellite velocity calculator, a pseudo velocity calculator for calculating the pseudo velocity between the MS and each satellite observed by the MS at a position measurement time of the MS using the velocity of satellites, and a satellite information acquisition information calculator.

The Office Action cites column 5, line 1 through column 6, line 18, and column 10, lines 32-64 of Nelson, as disclosing "a satellite data collector for collecting satellite orbital information and pseudo range of more than three consecutive times from a plurality of satellites". The Office Action further alleges that the above-mentioned sections of Nelson also discloses " a satellite velocity calculator for calculating velocity of satellites using the satellite orbital information; a pseudo velocity calculator for calculating pseudo velocities between the MS and each satellite observed by the MS at a

position measurement time of the MS using the velocity of satellites; and a satellite acquisition information calculator for calculating a code phase using the pseudo range, calculating a Doppler shih [sic; "shift"] using the pseudo velocity."

Respectfully, the Applicant disagrees. The cited sections from Nelson do not teach or suggest a satellite data collector, a satellite velocity calculator, a pseudo velocity calculator for calculating the pseudo velocity between the MS and each satellite observed by the MS at a position measurement time of the MS using the velocity of satellites, nor a satellite information acquisition information calculator as claimed in claim 1. Instead, column 5, line 1 through column 6, line 18 discloses different methods for reducing the computational load for solving Kepler's equation relating mean anomaly *M* to eccentric anomaly *E* (*M=E- e sin E*), including numerical integration and leapfrog integration. The aforementioned cited section of Nelson does disclose calculating a pseudo velocity, but not *a pseudo velocity calculator for calculating pseudo velocities between the mobile station (MS) and each satellite observed by the MS at a position measurement time of the MS using the velocity of the satellite* as claimed in independent claim 1. In regard to column 10, lines 32-64 of Nelson, again Nelson does disclose calculating a pseudo velocity, but not *a pseudo velocity calculator for calculating pseudo velocities between the mobile station (MS) and each satellite observed by the MS at a position measurement time of the MS using the velocity of the satellite* as claimed in claim 1 of the present invention. Instead, Nelson calculates a pseudo velocity in terms of the eccentric anomaly E, and the disclosure of Nelson is directed towards methods of interpolation and iteration to calculate the pseudo velocity.

Therefore, since Nelson does not teach or suggest every claimed feature of claim 1, Nelson cannot anticipate claim 1 of the present invention, and it is respectfully suggested that this rejection be withdrawn.

Furthermore, regarding claims 2 through 8, the Applicants respectfully submit that since it has been shown that Nelson does not teach or suggest all of the claimed features

of independent claim 1, and since claims 2 through 8 depend from claim 1, the rejection of claims 2 through 8 under 35 U.S.C. §102(b) should be withdrawn.

Regarding independent claim 9, the Applicants respectfully submit that the discussion above in regard to independent claim 1 applies as well to independent claim 9. Therefore, since Nelson does not teach or suggest every claimed feature of claim 9, Nelson cannot anticipate claim 9 of the present invention, and it is respectfully suggested that this rejection be withdrawn.

Furthermore, regarding claims 10 through 16, the Applicants respectfully submit that since it has been shown that Nelson does not teach or suggest all of the claimed features of independent claim 9, and since claims 10 through 16 depend from claim 9, the rejection of claims 10 through 16 under 35 U.S.C. §102(b) should be withdrawn.

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The Office Action also rejects claims 1-16 under 35 U.S.C. §102(b) as being anticipated by Issler. Issler discloses a process for the autonomous reduction of acquisition and tracking thresholds of carriers received in orbit by a receiver accessing an orbital navigator inside or outside the receiver, the latter having at least one phase loop. The phase loop, which is responsible for the acquisition and/or tracking of the carrier, is "pushed" by a fine speed aid and takes up the error between the real speed and the calculated speed. The search for the Doppler frequency of the carrier received takes place around a frequency prediction maintained by the fine speed aid coming from the orbital navigator.

Respectfully, the Applicant submits that Issler does not teach or suggest each and every claimed feature of independent claim 1. Independent claim 1 includes the claimed features of "a satellite data collector, a satellite velocity calculator, a pseudo velocity calculator for calculating the pseudo velocity between the MS and each satellite observed by the MS at a position measurement time of the MS using the velocity of satellites, and a

satellite information acquisition information calculator." Respectfully, the Applicant submits that Issler does not teach or suggest the claimed features of a satellite data collector, a satellite velocity calculator, a pseudo velocity calculator for calculating the pseudo velocity between the MS and each satellite observed by the MS at a position measurement time of the MS using the velocity of satellites, and a satellite information acquisition information calculator.

The Office Action cites column 3, line 59 through column 5, line 50 of Issler as disclosing "a satellite data collector for collecting satellite orbital information and pseudo range of more than three consecutive times from a plurality of satellites". The Office Action further alleges that the above-mentioned sections of Issler also discloses " a satellite velocity calculator for calculating velocity of satellites using the satellite orbital information; a pseudo velocity calculator for calculating pseudo velocities between the MS and each satellite observed by the MS at a position measurement time of the MS using the velocity of satellites; and a satellite acquisition information calculator for calculating a code phase using the pseudo range, calculating a Doppler shih [sic; "shift"] using the pseudo velocity."

Respectfully, the Applicant disagrees. The cited sections from Issler do not teach or suggest a satellite data collector, a satellite velocity calculator, a pseudo velocity calculator for calculating the pseudo velocity between the MS and each satellite observed by the MS at a position measurement time of the MS using the velocity of satellites, nor a satellite information acquisition information calculator as claimed in claim 1. Instead, column 3, line 59 through column 5, line 50 of Issler discloses certain features of a spread spectrum receiver. For example, in col. 3, lines 50-67, Issler discloses the process of tracking a carrier using a phase loop. The OCN, or digital carrier, varies the phase of the local carrier with a speed equal to an external speed prediction. Issler also discloses that "[t]he order of said loop must be adequate to keep the OCN slaved, which makes it possible *to produce pseudospeed measurements with the aid of a Doppler counter.*"

Issler, column 3, lines 65-67, emphasis added. This is not the same operation that occurs in Applicants' claimed invention, which claims a "a satellite acquisition information calculator for . . . *calculating a Doppler shift using the pseudo velocity*".

Issler also discloses other operations of the spread spectrum receiver in the aforementioned cited sections. In column 4, line 1, through column 5, line 50, Issler discloses the step of acquisition, and four different stages of the acquisition process. Acquisition is the process wherein the phase loop acquires the carrier frequency signals. In the second stage of acquisition, the spread spectrum receiver utilizes aids to assist in acquiring the carrier frequency of the transmitting satellite. These aids include the "date and time of [the] receiver clock, positions/speeds (or optionally orbital parameters) of emitters, [and] [the] position/speed or orbital parameters of [the]carrier satellite". Issler, column 4, lines 57-60. Respectfully, the use of these aids in acquiring the carrier frequency are not the same as the use of the aids for *a satellite data collector for collecting satellite orbital information and pseudo range of more than three consecutive times from a plurality of satellites* as claimed in claim 1 of the present invention. Further, Issler also does disclose increasing the number of pseudospeed measurements in the second stage, but this is neither definitely provided, nor of the same character as claimed in claim 1. It is respectfully suggested that the cited section of Issler does not teach or suggest any of the claimed features of claim 1 of the present invention

Therefore, since Issler does not teach or suggest every claimed feature of claim 1, Issler cannot anticipate claim 1 of the present invention, and it is respectfully suggested that this rejection be withdrawn.

Furthermore, regarding claims 2 through 8, the Applicants respectfully submit that since it has been shown that Issler does not teach or suggest all of the claimed features of independent claim 1, and since claims 2 through 8 depend from claim 1, the rejection of claims 2 through 8 under 35 U.S.C. §102(b) should be withdrawn.

Regarding independent claim 9, the Applicants respectfully submit that the discussion above in regard to independent claim 1 applies as well to independent claim 9. Therefore, since Issler does not teach or suggest every claimed feature of claim 9, Issler cannot anticipate claim 9 of the present invention, and it is respectfully suggested that this rejection be withdrawn.

Furthermore, regarding claims 10 through 16, the Applicants respectfully submit that since it has been shown that Issler does not teach or suggest all of the features of independent claim 9, and since claims 10 through 16 depend from claim 9, the rejection of claims 10 through 16 under 35 U.S.C. §102(b) should be withdrawn.

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The Office Action also rejects claims 1-16 under 35 U.S.C. §102(b) as being anticipated by Chenebault. Chenebault discloses a method of locating a receiver in a navigation system comprising a constellation of satellites transmitting signals. the method includes the steps of measuring pseudo-distances between the receiver and the satellites from the signals received from the satellites, measuring pseudo-speeds between the receiver and the satellites from signals received from the satellites, and computing the position of the receiver from the combination of measured pseudo-distances and pseudo-speeds. The position of the receiver is then computed by minimizing the matrix of covariance of the measured pseudo-distances and pseudo-speeds. This provides an accurate position of the receiver in a simple manner, in particular for a constellation of satellites in low Earth orbit.

Respectfully, the Applicant submits that Chenebault does not teach or suggest each and every claimed feature of independent claim 1. Independent claim 1 includes the claimed features of "a satellite data collector, a satellite velocity calculator, a pseudo velocity calculator for calculating the pseudo velocity between the MS and each satellite observed by the MS at a position measurement time of the MS using the velocity of

satellites, and a satellite information acquisition information calculator." Respectfully, the Applicant submits that Chenebault does not teach or suggest the claimed features of a satellite data collector for collecting satellite orbital information and pseudo range of more than three consecutive times from a plurality of satellites, and a satellite acquisition information calculator for calculating a code phase using the pseudo range, and for calculating a Doppler shift using the pseudo velocity.

The Office Action cites column 2, line 36 through column 3, line 35 of Chenebault as disclosing "a satellite data collector for collecting satellite orbital information and pseudo range of more than three consecutive times from a plurality of satellites". The Office Action further alleges that the above-mentioned sections of Chenebault also discloses " a satellite velocity calculator for calculating velocity of satellites using the satellite orbital information; a pseudo velocity calculator for calculating pseudo velocities between the MS and each satellite observed by the MS at a position measurement time of the MS using the velocity of satellites, and a satellite acquisition information calculator for calculating a code phase using the pseudo range, calculating a Doppler shih [sic; "shift"] using the pseudo velocity."

Respectfully, the Applicant disagrees. The cited sections from Chenebault do not teach or suggest a satellite data collector for collecting satellite orbital information and pseudo range *of more than three consecutive times* from a plurality of satellites, and a satellite acquisition information *calculator for calculating a code phase using the pseudo range, and calculating a Doppler shift using the pseudo velocity* as claimed in claim 1. Instead, column 2, line 36 through column 3, line 35 of Chenebault discloses a "pseudo-speed measuring means [that] advantageously measure[s] *the pseudo-speeds on the basis of the Doppler shift* of the signals received from the satellites. Chenebault, column 2, lines 52-54, emphasis added. This is wholly different than the claimed feature of claim 1, which claims "a satellite acquisition information calculator for. . . *calculating a Doppler shift using the pseudo velocity.*"

Furthermore, the Office Action cites column 2, line 36 through column 3, line 35 of Chenebault as disclosing "a satellite data collector for collecting satellite orbital information and pseudo range *of more than three consecutive times* from a plurality of satellites, and a satellite acquisition information *calculator for calculating a code phase using the pseudo range*." Respectfully, the Applicants' assert that these claimed features of claim 1 are not taught or suggested by Chenebault. Nowhere in the aforementioned cited section of Chenebault does it teach or suggest collecting satellite orbital information and pseudo range of more than three consecutive times from a plurality of satellites. Neither does Chenebault teach or suggest anywhere in the aforementioned cited sections of a satellite acquisition information calculator for calculating a code phase using the pseudo range.

Therefore, since Chenebault does not teach or suggest every claimed feature of claim 1, Chenebault cannot anticipate claim 1 of the present invention, and it is respectfully suggested that this rejection be withdrawn.

Furthermore, regarding claims 2 through 8, the Applicants respectfully submit that since it has been shown that Chenebault does not teach or suggest all of the claimed features of independent claim 1, and since claims 2 through 8 depend from claim 1, the rejection of claims 2 through 8 under 35 U.S.C. §102(b) should be withdrawn.

Regarding independent claim 9, the Applicants respectfully submit that the discussion above in regard to independent claim 1 applies as well to independent claim 9. Therefore, since Chenebault does not teach or suggest every claimed feature of claim 9, Issler cannot anticipate claim 9 of the present invention, and it is respectfully suggested that this rejection be withdrawn.

Furthermore, regarding claims 10 through 16, the Applicants respectfully submit that since it has been shown that Chenebault does not teach or suggest all of the claimed

features of independent claim 9, and since claims 10 through 16 depend from claim 9, the rejection of claims 10 through 16 under 35 U.S.C. §102(b) should be withdrawn.

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The Office Action also rejects claims 1-16 under 35 U.S.C. §102(b) as being anticipated by Landry. Landry discloses a method for reducing an acquisition and tracking thresholds, taking into account features relating to GPS receiver modification and gain on the performance improvement. The method according to Landry involves two steps: The first is to use the strong channels of the GPS receiver that are actually tracking satellites for velocity to aid other channels trying to acquire or track satellites that present a low signal-to-noise ratio due to lower elevation or masking conditions. The second aspect is to reduce the pre-detection bandwidth to the lowest value possible according to the characteristics of digital internal loops of the GPS receiver. According to Landry, these techniques improve the GPS accuracy and robustness.

Respectfully, the Applicants submit that Landry does not teach or suggest each and every claimed feature of independent claim 1. Independent claim 1 includes the claimed features of "a satellite data collector, a satellite velocity calculator, a pseudo velocity calculator for calculating the pseudo velocity between the MS and each satellite observed by the MS at a position measurement time of the MS using the velocity of satellites, and a satellite information acquisition information calculator." Respectfully, the Applicant submits that Landry does not teach or suggest the claimed features of a satellite data collector for collecting satellite orbital information and pseudo range of more than three consecutive times from a plurality of satellites, and a satellite acquisition information calculator for calculating a code phase using the pseudo range, and calculating a Doppler shift using the pseudo velocity.

The Office Action cites sections 1, 3.1, 4.1 and 5.1 of Landry as disclosing "a satellite data collector for collecting satellite orbital information and pseudo range of

more than three consecutive times from a plurality of satellites." The Office Action further alleges that the above-mentioned sections of Chenebault also discloses " a satellite velocity calculator for calculating velocity of satellites using the satellite orbital information; a pseudo velocity calculator for calculating pseudo velocities between the MS and each satellite observed by the MS at a position measurement time of the MS using the velocity of satellites, and a satellite acquisition information calculator for calculating a code phase using the pseudo range, calculating a Doppler shih [sic; "shift"] using the pseudo velocity."

Respectfully, the Applicant disagrees. The cited sections from Landry do not teach or suggest the claimed feature of "a satellite acquisition information calculator for calculating a code phase using the pseudo range, and calculating a Doppler shift using the pseudo velocity" as claimed in claim 1. Instead, section 1 of Landry discloses only of "supplying a pseudovelocity [sic]aiding to the carrier and/or the code loop". Section 3.1 of Landry discloses the calculation of a pseudorange noise measurement standard deviation and the calculation of a pseudovelocity noise measurement standard deviation. Section 4.1 of Landry discloses the calculation of a pseudorange measurement and the subsequent derivation of the expression of the "real useful pseudovelocity." Respectfully, the Applicants submit that the calculations of the pseudorange and the pseudovelocity are not the same as the claimed feature of claim 1, for at least the reason that Landry does not teach or suggest using satellite orbital information to calculate the pseudo range of more than three consecutive times from a plurality of satellites.

Section 5.1 of Landry discloses the synthesis and improvement of signal acquisition, and involves the use of a predicted value of the received code phase. Respectfully, the Applicants' submit that the cited section of Landry does not teach or suggest the use of a satellite acquisition information calculator for calculating a *code phase using the pseudo range*, nor for *calculating a Doppler shift using the pseudo velocity*.

Therefore, since Landry does not teach or suggest every claimed feature of claim 1, Landry cannot anticipate claim 1 of the present invention, and it is respectfully suggested that this rejection be withdrawn.

Furthermore, regarding claims 2 through 8, the Applicants respectfully submit that since it has been shown that Landry does not teach or suggest all of the claimed features of independent claim 1, and since claims 2 through 8 depend from claim 1, the rejection of claims 2 through 8 under 35 U.S.C. §102(b) should be withdrawn.

Regarding independent claim 9, the Applicants respectfully submit that the discussion above in regard to independent claim 1 applies as well to independent claim 9. Therefore, since Landry does not teach or suggest every claimed feature of claim 9, Issler cannot anticipate claim 9 of the present invention, and it is respectfully suggested that this rejection be withdrawn.

Furthermore, regarding claims 10 through 16, the Applicants respectfully submit that since it has been shown that Landry does not teach or suggest all of the claimed features of independent claim 9, and since claims 10 through 16 depend from claim 9, the rejection of claims 10 through 16 under 35 U.S.C. §102(b) should be withdrawn.

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The Office Action also rejects claims 1-16 under 35 U.S.C. §102(b) as being anticipated by Lobert. Lobert discloses a precise error model to characterize the statistics of each error term in the processing of pseudo-ranges and pseudo-velocities in a satellite-receiver system. The method of Lobert has been developed to characterize the statistics of each error term in function of the satellite-receiver geometry. The particular system in question is a new navigation satellite concept, INES (Innovative Navigation European System), which is currently proposed to prepare the transition between GNSS-1 and GNSS-2. This system is based on a Low Earth Orbit (LEO) constellation (around 1500 km altitude), completed by geosynchronous satellites of GNSS-1 (e.g. EGNOS). The

signals emitted by LEO satellites have large Doppler shifts. This may be an advantage if the pseudo-range measurements and the pseudo-velocity measurements (Doppler shifts converted to velocities) are combined to compute the position instead of being separately processed. The performance of this processing can only be estimated through good knowledge of the error budget for pseudo-ranges and pseudo-velocities. Therefore a precise error model has been developed to characterize the statistics of each error term in function of the satellite-receiver geometry. The navigation algorithm combines both raw measurements to estimate the user position and velocity, and calculates the associated precision.

Respectfully, the Applicants submit that Lobert does not teach or suggest each and every claimed feature of independent claim 1. Independent claim 1 includes the claim features of "a satellite data collector, a satellite velocity calculator, a pseudo velocity calculator for calculating the pseudo velocity between the MS and each satellite observed by the MS at a position measurement time of the MS using the velocity of satellites, and a satellite information acquisition information calculator." Respectfully, the Applicants submit that Lobert does not teach or suggest the claimed features of a satellite data collector for collecting satellite orbital information and pseudo range of more than three consecutive times from a plurality of satellites, and a satellite acquisition information calculator for calculating a code phase using the pseudo range, and calculating a Doppler shift using the pseudo velocity.

The Office Action cites page 2032 of Lobert, the section entitled "Addition of Doppler Measurements for Positioning" as disclosing "a satellite data collector for collecting satellite orbital information and pseudo range of more than three consecutive times from a plurality of satellites". The Office Action further alleges that the above-mentioned section of Lobert also discloses " a satellite velocity calculator for calculating velocity of satellites using the satellite orbital information; a pseudo velocity calculator for calculating pseudo velocities between the MS and each satellite observed by the MS

at a position measurement time of the MS using the velocity of satellites, and a satellite acquisition information calculator for calculating a code phase using the pseudo range, calculating a Doppler shih [sic; "shift"] using the pseudo velocity."

Respectfully, the Applicant disagrees. The cited section of Lobert does not teach or suggest a satellite data collector for collecting satellite orbital information and pseudo range *of more than three consecutive times* from a plurality of satellites, and a satellite acquisition information calculator *for calculating a code phase using the pseudo range, and calculating a Doppler shift using the pseudo velocity* as claimed in claim 1. Instead, page 2032 and 2033 of Lobert discloses the use of "other sources of information to improve the accuracy of positioning. These additional measurements are pseudovelocities (*Doppler converted to velocity units*)." Respectfully, the Applicants submit this is wholly different than the claimed feature of claim 1 of "*calculating a Doppler shift using the pseudo velocity.*" Furthermore, Lobert states that "[p]seudo velocities are derived from the carrier-phase lock loop measurements at two successive epochs." Respectfully, the Applicants submit this is wholly different than the claimed feature of claim 1 of "collecting satellite orbital information and pseudo range *of more than three consecutive times* from a plurality of satellites". Finally, nowhere in the aforementioned cited section of Lobert does it teach or suggest the claimed feature of claim 1 of "a satellite acquisition information *calculator for calculating a code phase using the pseudo range.*"

Therefore, since Lobert does not teach or suggest every claimed feature of claim 1, Lobert cannot anticipate claim 1 of the present invention, and it is respectfully suggested that this rejection be withdrawn.

Furthermore, regarding claims 2 through 8, the Applicants respectfully submit that since it has been shown that Lobert does not teach or suggest all of the claimed features of independent claim 1, and since claims 2 through 8 depend from claim 1, the rejection of claims 2 through 8 under 35 U.S.C. §102(b) should be withdrawn.

Regarding independent claim 9, the Applicants respectfully submit that the discussion above in regard to independent claim 1 applies as well to independent claim 9. Therefore, since Lobert does not teach or suggest every claimed feature of claim 9, Issler cannot anticipate claim 9 of the present invention, and it is respectfully suggested that this rejection be withdrawn.

Furthermore, regarding claims 10 through 16, the Applicants respectfully submit that since it has been shown that Lobert does not teach or suggest all of the claimed features of independent claim 9, and since claims 10 through 16 depend from claim 9, the rejection of claims 10 through 16 under 35 U.S.C. §102(b) should be withdrawn.

For all the reasons discussed above with respect to Nelson, Issler, Chenebault, Landry, and Lobert, the Applicants respectfully submit that the teachings of Nelson, Issler, Chenebault, Landry, and Lobert do not anticipate claims 1 through 16. Accordingly, the Applicants respectfully request that the Examiner withdraw all of the outstanding prior art rejections.

In view of the above, it is believed that the application is in condition for allowance and notice to this effect is respectfully requested. Should the Examiner have any questions, the Examiner is invited to contact the undersigned at the telephone number indicated below.

Respectfully submitted,

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Dated: January 18, 2005

References

The following references are attached:

1. Global Positioning System: Theory and Applications, Volume 1 by Bradford W. Parkinson, et al., page 138, Table 8; and
2. Understanding GPS Principles and Applications by Elliot D. Kaplan, page 38, Table 2.3